1. (previously presented): Method for information storage and data processing comprising the step of thermo-inducing or photo-inducing double-bond shifts in substituted [4n]-annulenes which are substituted by at least one group comprising an extended conjugated π-electron system which is in conjugation with the π-electron system of the [4n]-annulene core, thus generating transitions between two different conjugation states with at least one substituent, resulting in different UV/VIS spectra of the double-bond shifted isomers of [4n]-annulene, which provides the possibility to use distinct conjugation states (conjugation on-state and conjugation off-state) for information storage and data processing, whereby a carrier system is present that allows the modulation of a multitude of the corresponding [4n]-annulene molecules for the permanent or erasable storage of their corresponding conjugative states.

2. (original): Method according to claim 1, whereby the two different conjugation states are the conjugation on-state and conjugation off-state of the annulene core π-electrons relative to the substituent π-electrons.

3. (original): Method according to claim 1, whereby said [4n]-annulenes are bicyclic [4n]-annulenes.

4. (original): Method according to claim 3, whereby said bicyclic [4n]-annulenes are heptalenes.

5. (original): Method according to claim 1, whereby the [4n]-annulenes are substituted in 1,2- or 1,4-position relative to each other by two groups having an extended and conjugated π-electron system.

6. (previously presented): Method according to claim 1, whereby a multitude of [4n]-annulene molecules are arranged in a 1-dimensional or in a 2-dimensional or in a 3-dimensional way and wherein said conjugation states are spacially non-uniformly modulated.

7- 8. (cancelled).

9. (previously presented): Method according to claim 1, wherein the carrier comprises a low-melting glass or polycarbonates, polyacetates, methacrylates, styrenes and copolymers thereof, as well as copolymers with polymerisable [4n]-annulenes.

10. (previously presented): Method according to claim 6, whereby a holographic grating is generated by modulating said conjugation states.

11. (original): Method according to claim 6, wherein the spacially non-uniformly modulated conjugation states are generated by a low-energy laser that provides for a local heating so bring the [4n]-annulenes into switching condition and whereby the laser light causes locally, if required, the switch from the conjugative on-state to the conjugative off-state.

12. (original): Method according to claim 6, comprising further to said step of modulating a multitude of [4n]-annulene molecules in a 1-dimensional or 2-dimensional or 3-dimensional way and wherein said conjugation states are spacially non-uniformly modulated, a further step wherein at least one of the optical, electrical or magnetic properties being attributable to said switchable conjugation states is determined and processed.

13. (original): Method according to claim 1, wherein said conjugation states are determined by an optical read-out step.

14. (original): Method according to claim 1, wherein the determination of the spacially non-uniformly modulated conjugation states is used for the optical reading of information.

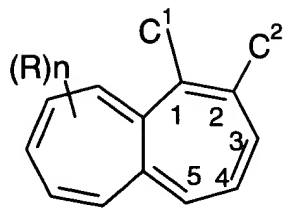
15. (previously presented): Method according to claim 1, wherein the determination of the spacially non-uniformly modulated conjugation states is used for optical switching and computing.

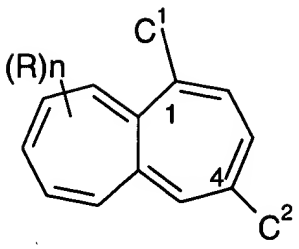
16. (cancelled).

17. (previously presented): [4n]-heptalenes according to claim 26, whereby, C^1 and C^2 represent independently from each other a hydrogen atom, a methyl group, a phenyl group, an ethyl ester group, a methyl ester group, a (E)-PhCH=CH-group, a (E)-4-$MeOC_6H_4CH$=CH-group, a (E)-4-ClC_6H_4CH=CH-group, a 4-$MeOC_6H_4$-group, a -CH=CH-CH=CH-C_6H_5 group, a -CH=CH-$C_6H_4NO_2$-4 group, a -CH=CH-C_6H_4OMe-4 group, with the proviso that a heptalene being substituted by a methyl ester group at the position 1, a –CH=CH-CH=CH-C_6H_5 group at the positions 2 and 5, an isopropyl group at the position 7 and a methyl group at the position 10 is excluded.

18. (previously presented): [4n]-heptalenes according to claim 26, whereby said further substituents R are selected from the group comprising substituted or unsubstituted C_1-C_{12}-alkyl groups or photoactive diazo-containing groups.

19. (currently amended): Method for the preparation of substituted heptalenes of the formula (I) or (II), according to claim 26





(I) (II)

whereby C^1, C^2, R and n are as ~~above~~ defined in claim 26,

comprising the steps of

(a) obtaining a heptalene-dicarboxylate by a reaction of a correspondingly substituted azulene with acetylenedicarboxylate, and optionally

(b) transforming at least one carboxylic group or another substituent that was entered by the preliminary Diels-Alder reaction into the desired conjugated substituent having an extended π-electron system.

20. (original): Method according to claim 19, whereby a heptalene-4,5-dicarboxylate carrying a methyl substituent at the position 1 of the heptalene ring is obtained.

21. (original): Method according to claim 19, further comprising a step (c) wherein at least one of the carboxolate groups within the heptalene ring is replaced by a conjugated substituent containing an extended π-electron system.

22. (original): Method according to claim 21, wherein the carboxylate group at the position 4 of the heptalene ring is replaced by a conjugated substituent containing an extended π-electron system.

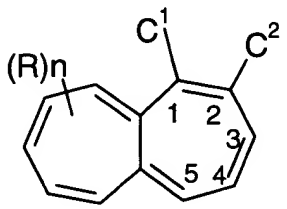
23. (previously presented): An optical storage device comprising at least one substituted [4n]-annulene according to claim 26.

24. (previously presented): A non-linear optical device comprising at least one substituted [4n]-annulene according to claim 26.

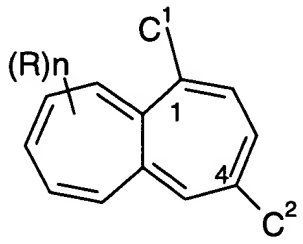
25. (previously presented): Process of information storage and data processing by using substituted [4n]-annulenes which are substituted by at least one group comprising an extended conjugated π-electron system which is in conjugation with the π-electron system of the [4n]-annulene core undergoing thermally induced or photo-induced double-bond shifts thus generating or processing

previously generated at least two different conjugation states with at least one substituent in selected regions of storage medium, whereby a carrier system is present that allows the modulation of a multitude of the corresponding [4n]-annulene molecules for the permanent or erasable storage of their corresponding conjugative state.

26. (previously presented): Substituted [4n]-heptalenes of the general formula (I) or (II) being optically and/or thermally switchable, based on thermal or photochemical double-bond shifts (DBS),



(I)

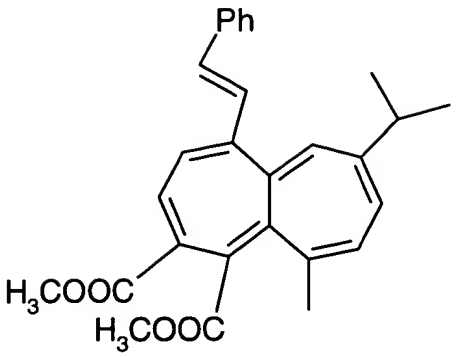


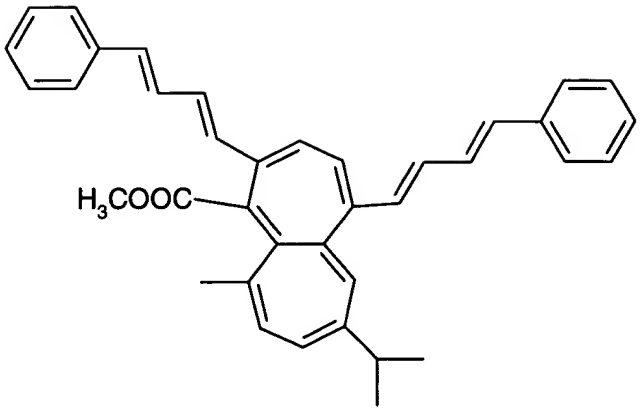
(II)

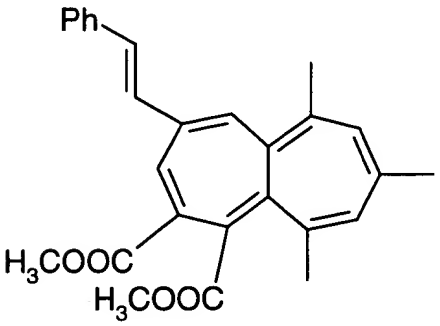
whereby C^1 and C^2 represent independently from each other a hydrogen atom, a substituted or unsubstituted C_1-C_{12}-alkyl group, a substituted or unsubstituted C_1-C_{12}-alkoxy group, a substituted or unsubstituted aryl-C_1-C_{12}-alkyl group, a substituted or unsubstituted C_1-C_{12}-alkenyl group, a substituted or unsubstituted C_1-C_{12}-conjugated alkenyl group, a substituted or unsubstituted C_1-C_{12}-alkinyl group, a substituted or an unsubstituted phenyl group, a substituted or an unsubstituted heterocyclic group, a cyano group, a nitro group, a thiocyanate group, a C_1-C_{12}-ester group being optionally polymerisable with copolymers, with the proviso that at least one of said substituents C^1 and C^2 contains an extended conjugated π-electron system which is in conjugation with the π-electron system of the heptalene core, and

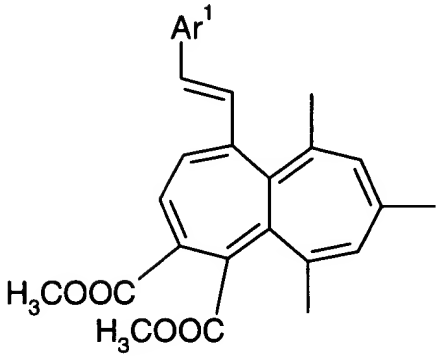
whereby said [4n]-heptalenes can comprise at least one further substituent R being selected from the above indicated groups with n being 0-8,

provided that if one of the at least one further substituents R is an isopropyl group at the position 9 of the heptalene ring, the substituent at the position 6 must not be a methyl group, and with the proviso that heptalenes having the following substituents including their valence isomers are excluded:

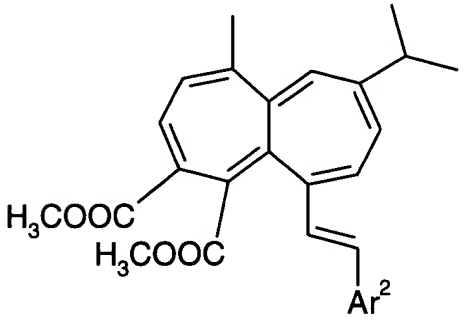








wherein Ar^1 is phenyl, 4-chloro phenyl or 4-methoxy phenyl, and



,wherein Ar^2 is phenyl or 4-methoxy phenyl.

27. (previously presented): Substituted [4n]-annulenes according to claim 26, wherein at least one of the groups C^1, C^2 or R is a group -COO-$(CH_2)_n$OH, a group -COO-$(CH_2)_n$OOC-$C(CH_3)=CH_2$ or a group -COO-$(CH_2)_nC_6H_4$-4-$CH=CH_2$ wherein $n \geq 2$.